



## VACUUM CHAMBER PM TECHNIQUE NOVELLUS CONCEPT ONE & TWO / SEQUEL & SEQUEL EXPRESS & VECTOR

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### **OBJECTIVE:**

TO PM THE NOVELLUS CONCEPT ONE AND TWO IN AN EFFECTIVE AND TIMELY MANNER WHILE REDUCING RISK OF DISHING TO THE HEATER BLOCK, IMPROVING PARTICLE PERFORMANCE, TOOL RECOVERY AND MAXIMIZING TOOL UPTIME

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#### **Vacuum Chamber:**

NOVELLUS CONCEPT ONE & TWO / SEQUEL & SEQUEL EXPRESS & VECTOR

#### **Vacuum Chamber Process Residue:**

VARIOUS HARD OXIDE, NITRIDE, AND GLASSLIKE RESIDUES

#### **Vacuum Chamber Components:**

HEATER BLOCK, FORK GROOVES AND CERAMIC FORK ASSEMBLY

#### **Old Procedure:**

ScotchBrite<sup>®</sup>, commercial grade sandpaper and cleanroom wipers. Hard, lengthy scrubbing regimes generate large amounts of particles and may cause dishing to the heater block

#### **Solvent:**

DI followed by IPA, HF for ceramic fork assembly

#### **Vacuum Chamber Products:**

- (1) [FT951](#) ErgoSCRUB<sup>®</sup> Handle
- (2) [HT4514DC3](#)-1 140 Grit Diamond ScrubDISK<sup>®</sup>, [HT4516DC3](#)-1 160 Grit Diamond ScrubDISK<sup>®</sup>, [HT4518DC3](#)-1 180 Grit Diamond ScrubDISK<sup>®</sup>, [HT4522DC3](#)-1 220 Grit Diamond ScrubDISK<sup>®</sup>, [HT4528DC3](#)-1 280 Grit Diamond ScrubDISK<sup>®</sup>, and/or [HT4536DC3](#) 360 Diamond ScrubDISK<sup>®</sup>
- (2) [HT5790S](#)-25 MiraWIPE<sup>®</sup> or [HT4790](#)-25 UltraSOLV<sup>®</sup> Wipe
- (1) [HT4754](#) UltraSOLV<sup>®</sup> Sponge
- (10) [HT1701](#) UltraSOLV<sup>®</sup> Swab
- (1) [HT179018D](#)-1 180 Grit Diamond ScrubTIP<sup>®</sup>
- (4) [HT1700](#)-5 UltraSOLV<sup>®</sup> Swab
- (1) Container that can hold 1 liter of DI water
- (1) [FT900](#) Soft ErgoSCRUB<sup>®</sup>
- (1) [HT4536D3](#)-1 360 Grit Diamond ScrubPAD

**NOTE:** Depending on amount of deposition build-up and if the tool has been PM'd in the past, products may vary and/or additional products may be required

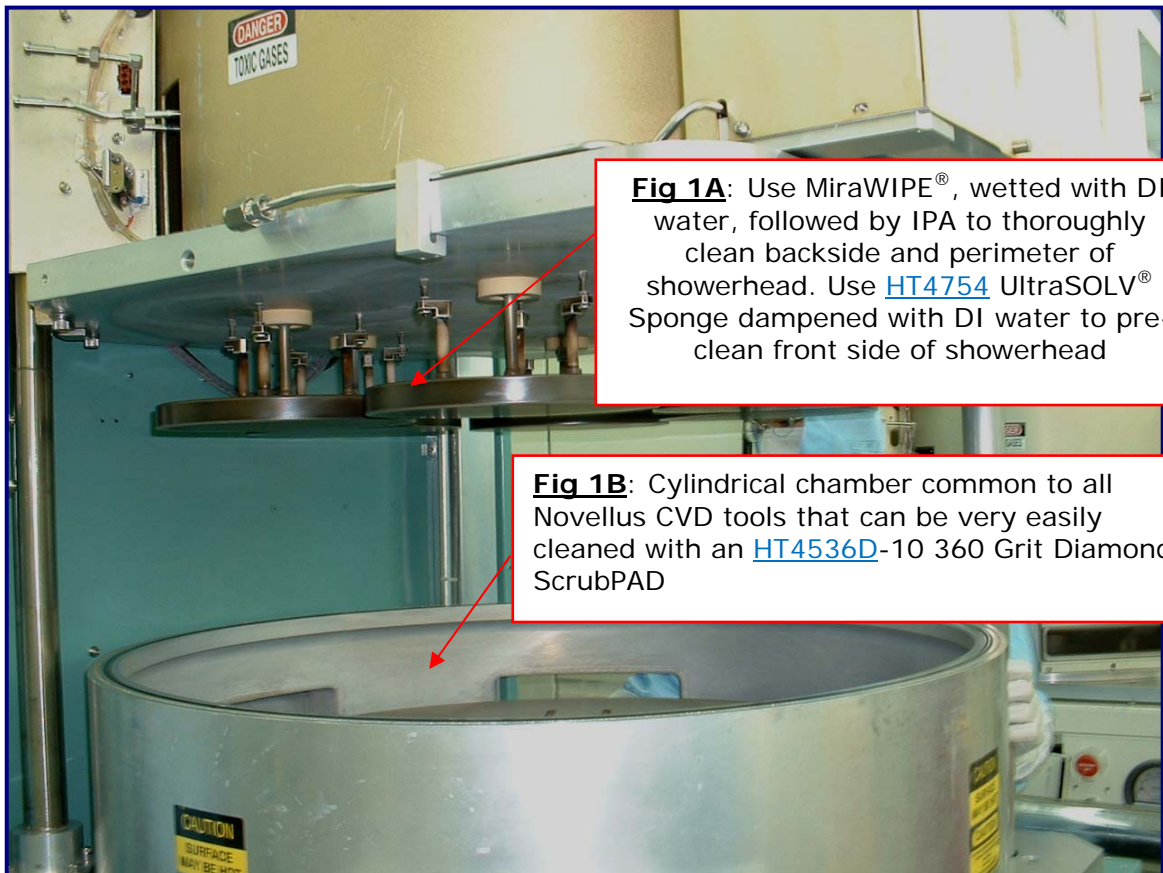
## **NOVELLUS CONCEPT ONE & TWO PM PROCEDURE:**

View "How to" instructional videos on <http://www.foamtecintlwcc.com/flash/>

**NOTE:** If ceramic forks need to be cleaned manually, the use of the [HT4528D-10](#) or [HT4536D-10](#) 360 Grit Diamond ScrubPAD is recommended. This pad can also be used to speed up the cleaning of the ceramic fork groove. If the fork grooves will be cleaned manually, an additional 10 pieces of [HT5790S](#) wipers will be required

## **PRE-CLEANING THE TOOL**

**Step 1:** Use the [HT4754](#) UltraSOLV® Sponge to clean the lightly adhered residue on and around the showerhead, heater block and base of the tool. Immerse sponge into DI water to clear, wring-out to remove excess water (See Fig 1A)



(Fig 1 Novellus Concept I Chamber: Oxide or Nitride Films)

**NOVELLUS CONCEPT ONE & TWO PM PROCEDURE (CONT'D):**

**SCRUBBING THE TOOL**

**Step 2:** If the heater block will be scrubbed with DI water, pre-clean the entire heater block with the rinsed [HT4754](#) UltraSOLV<sup>®</sup> Sponge

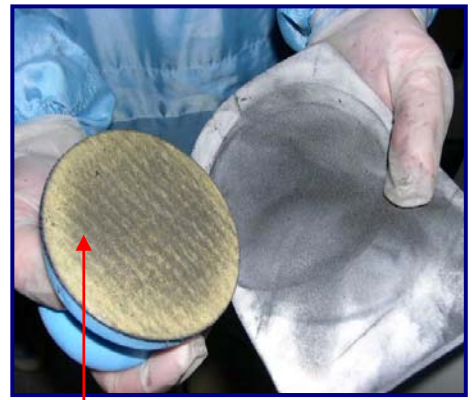
If the heater block will be scrubbed dry, assemble the appropriate ScrubDISK<sup>®</sup> and ErgoSCRUB<sup>®</sup> handle and proceed to scrub the heater block. Use a back and forth motion from the perimeter to the center of the block or a circular motion. To remove build-up from the ScrubDISK<sup>®</sup>, use the lightly dampened UltraSOLV<sup>®</sup> Sponge or [HT4790](#) UltraSOLV<sup>®</sup> Wiper (**do not use the [HT5790S](#) MiraWIPE<sup>®</sup> Wiper for this**) and wipe the face of the ScrubDISK<sup>®</sup> in one direction (See Fig 2, 3 & 4)



**Fig 2:** ScrubDISK<sup>®</sup> loaded with deposition



**Fig 3:** Pull & twist ScrubDISK<sup>®</sup> across UltraSOLV<sup>®</sup> Sponge



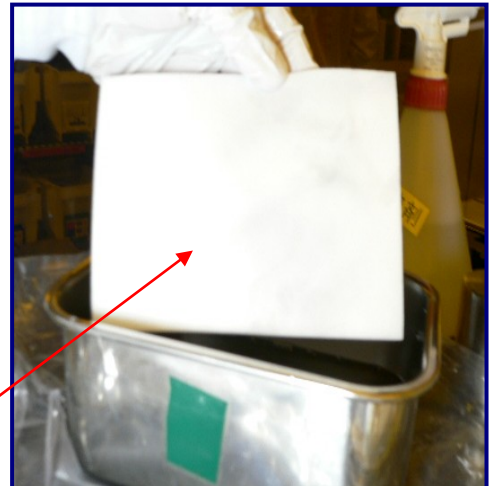
**Fig 4:** Unloaded ScrubDISK<sup>®</sup>

As UltraSOLV<sup>®</sup> Sponge becomes loaded with deposition, rinse in container of DI water (See Fig 5 & 6)



**Fig 5:** UltraSOLV<sup>®</sup> Sponge loaded with deposition

**Fig 6:** UltraSOLV<sup>®</sup> Sponge free of deposition after rinse in DI water



**NOVELLUS CONCEPT ONE & TWO PM PROCEDURE (CONT'D):**

Each time a section of the block has been scrubbed, thoroughly clean the section with the dampened [HT4754](#) sponge. For best results, it is suggested to clean each section several times with the rinsed sponge

Repeat step 2 until the heater block is clean

**NOTE:** The hardness of the build-up will determine which grit (140 – 280) Grit Diamond ScrubDISK® is selected. It is recommended to start with the 280 Grit ScrubDISK® and move down until the residue is easily removed from the block, using the lightest, more uniform scrubbing motion possible (See Fig 1B)

**SCRUBBING THE FORK GROOVES**

**Step 3:** To clean the fork groove, run the [HT179018D](#) ScrubTIP® up and down the fork groove until the entire residue is removed. This can be accomplished dry or wet, but in either case it will be necessary to clean the residue off the ScrubTIP® with the [HT4754](#) UltraSOLV® Sponge or with an UltraSOLV® Wiper. If the build-up in the groove is very hard, fold it over and shape it to the groove. Run it up and down the groove using the [HT179018D](#) ScrubTIP® as a handle (See Fig 8A)

To pre-clean the fork grooves after scrubbing, use the edge of the [HT4754](#) UltraSOLV® Sponge to clean the groove with DI water

**IMPORTANT NOTE**

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**THE USE OF [HT5790S](#) MiraWIPES® DURING THE FINAL WIPE PORTION OF THE PROCEDURE IS A CRITICAL STEP TO EFFECTIVELY REMOVE PARTICLE DEFECTS FROM THE NOVELLUS**

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Figure below shows how much more deposition the Foamtec International MiraWIPE® can remove from a critical surface compared to the standard fab wiper, making the MiraWIPE® Final Wipe the most **CRITICAL STEP** of the PM procedure (See Fig 7a & 7b)



**MiraWIPES® are the KEY STEP for DEFECT REDUCTION and IMPROVED TOOL RECOVERY.**

**NOVELLUS CONCEPT ONE & TWO PM PROCEDURE (CONT'D):**

**Step 4:** To finish cleaning the heater block and fork grooves, use IPA with [HT5790S](#) MiraWIPE® Wipers backed up by the [HT1700](#) Swab to completely clean loose particles out of all the grooves. For better results, alternate back and forth between the wiper and the swab. Repeat until no visible residue transfers to the wiper or swab (See Fig 8B)

Once the grooves are clean; use IPA on one of the wipers ([HT4790](#) or [HT5790S](#)) to clean the block. Clean one section at a time and repeat until no visible residue transfers to the wiper

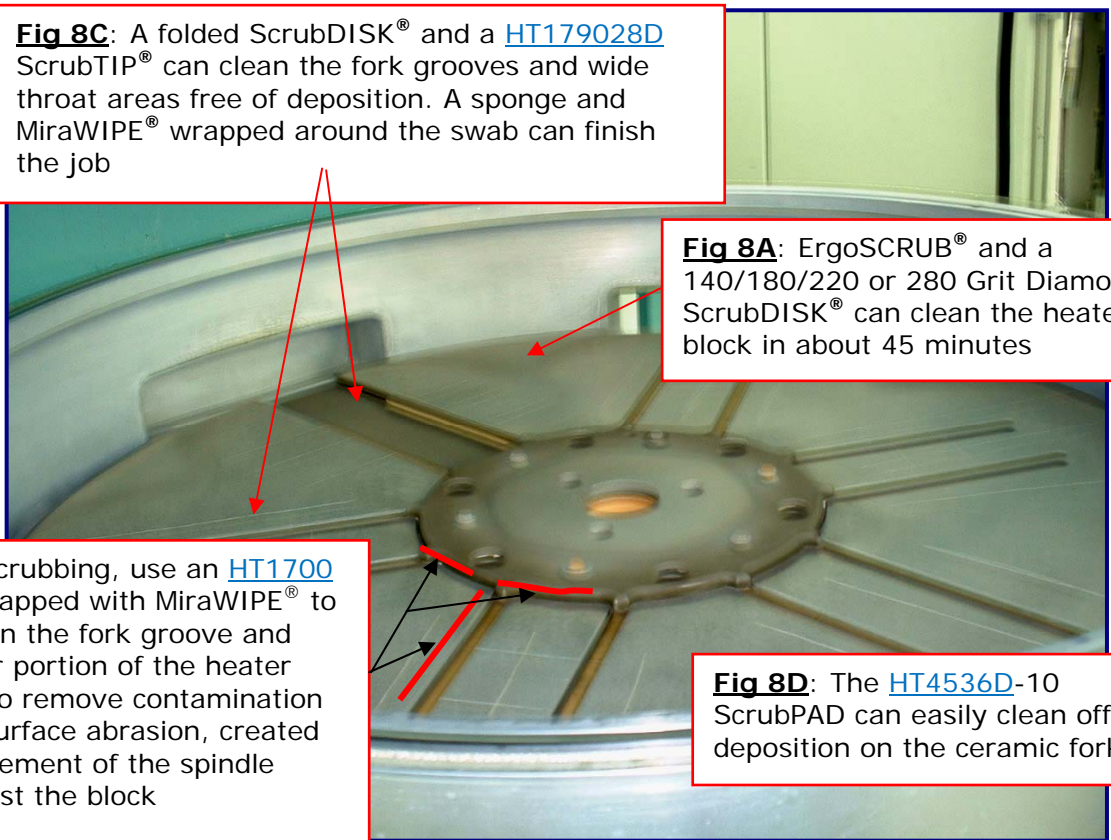
For customers with heater blocks that have ports built into the side of the block, the [HT1701](#) UltraSOLV® Swab wetted with IPA can clean the inside of the port

**Fig 8C:** A folded ScrubDISK® and a [HT179028D](#) ScrubTIP® can clean the fork grooves and wide throat areas free of deposition. A sponge and MiraWIPE® wrapped around the swab can finish the job

**Fig 8A:** ErgoSCRUB® and a 140/180/220 or 280 Grit Diamond ScrubDISK® can clean the heater block in about 45 minutes

**Fig 8B:** After scrubbing, use an [HT1700](#) and [HT1701](#) wrapped with MiraWIPE® to thoroughly clean the fork groove and recessed center portion of the heater block in order to remove contamination generated by surface abrasion, created during the movement of the spindle assembly against the block

**Fig 8D:** The [HT4536D-10](#) ScrubPAD can easily clean off the deposition on the ceramic fork

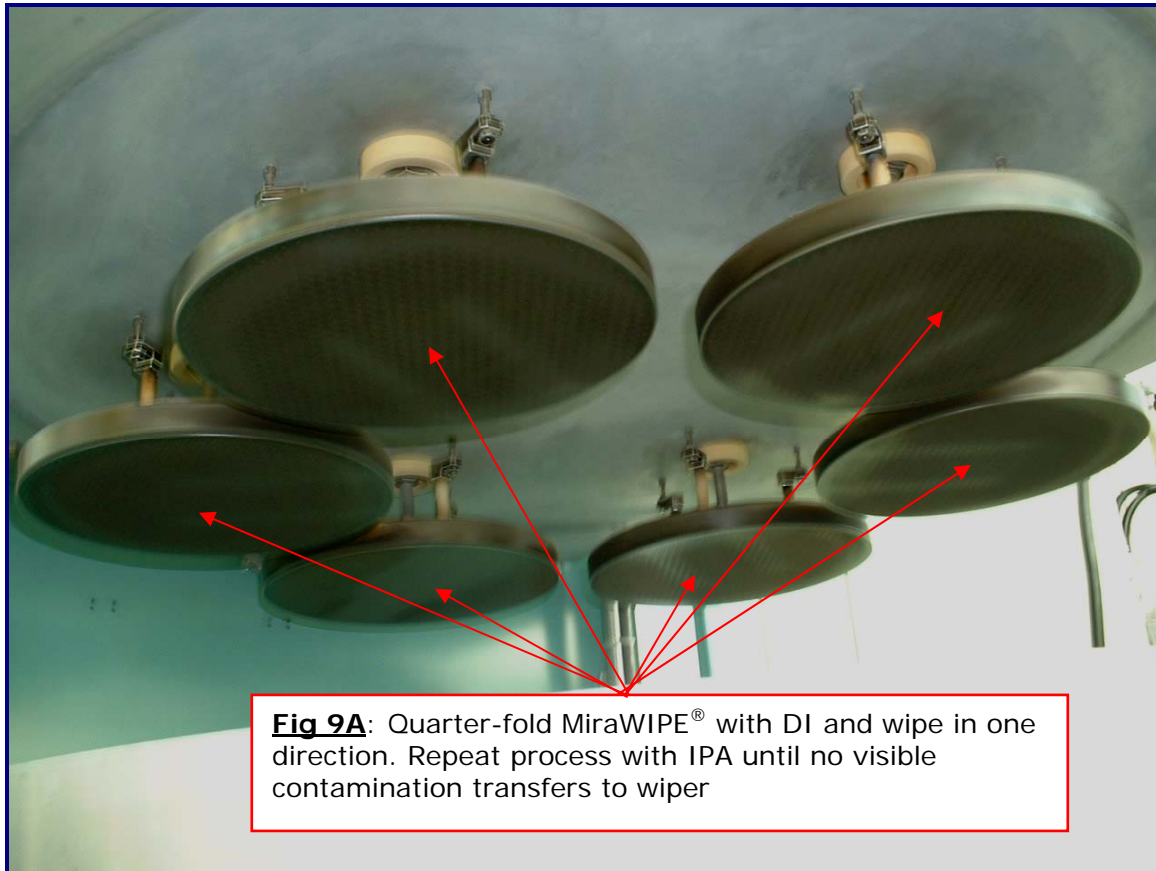


**Step 5:** The fork assembly can be cleaned with an [HT4536D-10](#) or a [HT4528D-10](#) ScrubPAD, depending on process residue. Choose the ScrubPAD that removes the residue with the lightest scrubbing action. The fork assembly should be cleaned wet. Pre-clean the assembly with the [HT4754](#) sponge wetted with DI water. Final Clean it with an [HT5790S](#) wiper wetted with IPA (See Fig 8D)

Repeat until no visible residue transfers to the wiper

**NOVELLUS CONCEPT ONE & TWO PM PROCEDURE (CONT'D):**

**Step 6:** After heater block has been cleaned, precede to final clean the shower heads following the procedure outlined in picture (See Fig 9A)



(Fig 9 Concept I Shower Head)

**Step 7:** Finish the PM by thoroughly cleaning areas under the heater block as particles generated by scrubbing the block may have deposited on the base

**NOTE:** For users that need to clean the showerheads while hot, the risk of melting wipers to the showerhead can be reduced as follows:

Use a fresh UltraSOLV® [HT4754](#) Sponge and fully saturate with DI water. Squeeze it so that it is 50% saturated. Wrap three to four damp sheets of [HT5790S](#) MiraWIPE® Wipers around the sponge so that only the face of the wipers will make contact with the showerhead. Wipe the showerhead in one direction

**Step 8:** Use the [HT4536D](#)-10 Diamond ScrubPAD to clean the chamber barrel. If the deposition is very heavy, an [FT900](#) ErgoScrub® handle and an [HT4536DC3](#)-1 ScrubDISK® will speed up the scrubbing procedure. The chamber should be final cleaned with DI water dampened [HT5790S](#) followed by an IPA dampened [HT5790S](#)